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ABSTRACT

A study conducted at Southwest Virginia Community College investigated the cognitive styles of students who were enrolled in distance education courses for one semester. Because video-based presentations of material severely limit teacher-student interaction, the distance learner must possess self-discipline, self-organization, and self-planning to direct the learning process. The study's hypothesis predicted that field-independent students would be more successful in distance education telecourses than field-dependent students. According to a cognitive test 71 percent of the students were determined to be field dependent. However, at the conclusion of the telecourse, 67 percent passed the course successfully with a C or better. The study concluded the hypothesis was incorrect. Field-independent students are not more successful in asynchronous distance education telecourses than those who are field-dependent. Findings indicate that cognitive style does not have an impact on student success in distance education, and should encourage educators to offer distance education to all types of students. Contains 31 references. (YKH)

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An Analysis of Student's Cognitive Styles in Asynchronous Distance Education Courses at a Community College

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Asynchronous distance education courses are the technological version of traditional correspondence courses. Commonly there is limited interpersonal interaction between instructor and student. The purpose of this study was to determine if students with certain cognitive styles were more likely to be successful. Students were categorized as field dependent/independent. Chi-square analysis indicated that traditional aged females (and females as a group) were significantly field dependent however this did not relate to achievement rates.

Distance education is not a new phenomenon in American education. Correspondence courses have been in existence for over one hundred years. What is different is the use of technology to deliver college level courses to students who are separated from the teacher. Asynchronous forms of education do not require the student and teacher to be time and space bound (Cartwright, 1994). This type of distance education or correspondence courses which utilize technology are the ". . . fastest-growing instructional pattern in the world" (Hall, 1990, p. 48).

In this report, asynchronous distance education courses are referred to as telecourses because the students receive a video of the professor's lectures. Cartwright (1994) notes that, "It is an instructional approach that does not require students and instructors to be in the same place at the same time, or even available during a specific time" (p. 31). In fact the student receives a ". . . pre-prepared study package" (Kember, Lai, Murphy, Siaw, & Yuen, Fall, 1994) that includes such items as: course syllabus, telecourse procedures from office/staff in a bureaucratic department of a college or a university; times and dates when assignments must be submitted; locations where to take tests; and procedures for receiving assistance from staff or faculty. It is a form of instruction that is "learner centered" (Beaudoin, 1990, p. 21).

Moore (1991) argues that distant education refers to more than just physical separation of teaching and learning. He uses the term "transactional distance" that requires a special set of circumstances. He states, "It is the physical separation that leads to a psychological and communications gap, a space of potential misunderstanding between the inputs of the instructor and those of the learner, and this is the transactional distance" (p.3). This affects what Moore calls the dialogue and structure of teaching. "For example, an educational program in

which communication between teacher and learner is solely by television permits no dialogue; the student might make a response to a teacher but no consequent response by the teacher is possible" (p. 3). A gap between the teacher and the student widens with telecourses. In highly transactional telecourses, the student has little control over the structure of the course. The student may be able to view and review a video taped lecture but can not dialogue with the teacher.

When Wilkinson and Sherman (1991) conducted a survey of 276 institutions of higher learning offering distance education programs, they discovered that the most frequently used form of distance education was video based technology. "Three-fourths of the programs used video-based technology as the primary method in more than half of their courses with 47.7 percent using it as the primary method in every course" (p. 56). They also discovered that "Print was the primary method of student/faculty interaction (50.8% of the programs) in over 75 percent of the courses offered" (p. 56). As colleges seek to attract and retain students they must understand what the impact of technology on students learning.

In the traditional classrooms learner satisfaction can be observed empirically; however, in educational courses that employ sophisticated technology, methods of understanding the student must be utilized. The focus of this study was to investigate the cognitive styles of students who were enrolled in distance education courses at a community college during one semester.

Psychological Factors

The study of the psychological aspects of learning can take a researcher in many directions. Studies have examined the issue of pacing for completion of distance education courses (Shale, 1987), learner-interface with technology (Hillman, Willis, & Gunawardena, 1994), adult learners' needs and learning styles (Hayes, 1990), alternative distance education delivery methods (Beare, 1989), loneliness, (Pugliese, 1994), the role of conation (striving), (Atman, 1987), course satisfaction (Biner, Dean, & Mellinger, 1994; St. Pierre & Olson, 1991), student anxiety (Moore, 1989), and the dimensions of control in distance education (Baynton, 1992).

Schuemer (1993) points out that the distance learner must have the psychological will power to direct the learning process. He notes that the distance learner must possess a high degree of self-discipline, self-organization, and self-planning. Ehrman (1990) states, "In the field of distance education, much research on individual factors needs to be done" (p. 18). Ehrman further suggests that learners should be given a "learning style configuration" (p. 18) which could be used to encourage or discourage students from enrolling in distance learning courses. "Certainly understanding of psychological variables can make a major contribution to sophisticated learner counseling, not only on learning strategies but also on affective matters" (Ehrman, 1990, p. 19). Beaudoin (1990) adds, "Learners

are in varying stages of cognitive and psychological readiness for self-directed learning activities and, while for some the format seems familiar and comfortable, for others the prospect of studying in this way is intimidating" (p. 24).

Merriam and Caffarella (1991) report that cognition impacts learning in that, "Learning involves the reorganization of experiences in order to make sense of the stimuli from the environment" (p. 129). Various researchers define cognitive style as: ". . . the ways in which one goes about organizing and processing information to complete a task (Bostic & Tallent-Runnels, 1991, p. 1299); ". . . skills by means of which learners regulate their own internal processes of attending, learning, remembering, and thinking" (Gagne, 1985, p. 55); ". . . are characterized as consistencies in information processing that develop in concert with underlying personality trends" (Merriam & Caffarella, 1991, p. 175); ". . . the way an individual acquires and uses knowledge" (Popham, 1993, p. 59); ". . . our characteristic and preferred ways of perceiving, interpreting, organizing, and thinking about information . . ." (Erickson & Strommer, 1991, p. 55); and ". . . the individual's characteristic mode of perceiving and organizing information about the environment" (York & Tinsley, 1986, p. 535).

To understand cognitive styles and their educational significance, Witkin, Moore, Goodenough, and Cox (1977) investigated the nature of cognitive styles by researching the concepts of field dependence-independence. They discovered two different types of individuals. Witkin et al. states field dependent students:

> . . . favor educational-vocational areas in which involvement with others is a central feature and in which the subject matter of the discipline features human content, and the tendency of field-independent students, on the other hand, to favor areas that are more solitary in their work requirements and more abstract in their substantive content" (p. 13).

Field dependent students are more likely to have difficulty learning information that requires them to establish their own mediation styles, and they will need more "explicit instruction in problem-solving strategies" (p. 25) than field dependent students. This research project, then, hypothesized that field independent students would be more successful in self-directed distance education telecourses.

To easily determine if an individual is either field-dependent or field-independent, Witkin, Oltman, Raskin, & Karp (1971) created the Group Embedded Figures Test (GEFT) which ". . . is concerned with assessing function in a narrow type of perceptual task; namely, tasks requiring disembedding" (1986, p. 189). In this test a subject is given a figure and asked to extract the embedded figure from a field of figures. Thompson and Melancon (1987) note that the GEFT ". . . produces expected desired variations when the subjects are adults rather than children" (p. 70). According to Kepner and Neimark (1984) the GEFT is a reliable measure following test-retest data. Viability of this test is enhanced with distance education telecourse students because it takes less than 30 minutes to complete.

Purpose of the Research

This research project was designed to explore variables associated with student's cognitive style in distance education. It was an attempt to create preliminary data on students during a single semester to determine the relationship between student's cognitive style and achievement in a telecourse. Two additional purposes were 1) to determine if a difference existed in achievement between males and females, and 2) to determine if a difference existed between students who were traditional (18-22) age and those who were non-traditional (23 and above) age.

During the first two weeks of the summer semester 1996, all students who were enrolled in distance education class at Southwest Virginia Community College (SVCC) were asked to take the 20 minute GEFT. Of the three hundred and eighteen students who were enrolled, the sample consisted of 154 (47%) students who volunteered to take the GEFT. Students were enrolled in over 25 different courses ranging from academic college transfer courses to student orientation courses.

Descriptive Data

The sample population consisted of 116 (75.3%) females and 38 (24.7%) males which mirrored the gender composition of all the students enrolled at the college. There were 64 students in the traditional age group with a mean age of 20.2 years. The 90 students in the non-traditional age group had a mean age of 32.9 years. The sample population had a mean age of 28.6 which also mirrored the mean age of all the students at SVCC.

The GEFT scores consist of numerical rankings from 0-18. Kepner and Neimark (1984) ranked field dependent persons as those with scores of 0-9 (p. 1408). The students with scores 10 to 18 were ranked as field dependent. From this dichotomized classification, the sample consisted of 40 (25.9%) field independents and 114 (74.1%) as field dependent. Generally, humans due to their social nature are more likely to be field dependent.

In the sample, 104 (67.5%) of the students were ranked as successful which meant they had received a C or better in their telecourse. The 50 (32.5%) of the students who were unsuccessful were those who received a D, F, an incomplete or had withdrawn from the course. The unsuccessful rate of the sample population was comparable to the rate of all the students enrolled in distance education telecourses at SVCC.

Findings

Chi-square statistical procedures was conducted on the variables of gender, age, and achievement. Chi-square "is a nonparametric test of significance appropriate

when the data are in the form of frequency counts" (Gay, 1992, p. 443). The variables consisted of nominal data; therefore the "frequencies of occurrence with theoretical or expected frequencies" (Hinkle, Wiersma, and Jurs, 1994, p. 535) was investigated. The Statistical Package for the Social Sciences (SPSS) software was used to compute the test statistic which was tested at an alpha level of .05.

Of the eleven hypotheses that were tested only two indicated a significant difference. There was a significant difference in the GEFT scores for males and females: X^2 (1, $\underline{N}$ = 154) = 9.24, $\underline{p}$ = .002 (< .05). Data indicated that females (80.2%) were more likely to be field dependent than males. This is consistent with Sorensen and Robinson (1992) who found younger female college student had a different psychological type than nontradtional females. There was no statistical difference between the males in the study: 55.3% were field dependent and 44.7% were field independent.

In the second case, there was a significant difference between males and females' GEFT ranking of field independent-dependent for traditional aged distance education students: X^2 (1, $\underline{N}$ = 64) = 8.19, $\underline{p}$ = .004 (< .05). Traditional aged females (78.7%) were more likely to be field dependent. All the other age hypothesis did not indicate significant differences. Age was not a major factor when investigating the students' GEFT ranking.

The achievement variable was investigated on the remaining hypotheses. Results of the tests indicated no significant differences in achievement for asynchronous distance education students through an analysis of the variables: field independent-dependent students, traditional aged students, nontraditional students, males and females.

The total analysis of the variables answered the basic research question of this study: "Are field independent students more successful in asynchronous distance education courses than field dependent students?" Clearly the answer is no. Although the research group consisted of 75% females who are more likely to be field dependent, this did not impact their success in the telecourse.

Conclusion

Findings of this research project indicate that cognitive style does not impact a student's ability to successfully complete a distance education course and should encourage educational institutions to offer distance education to all types of students. Researchers concerned about the changing age of students taking distance education courses (Carl, 1991) should see these findings as support for offering asynchronous courses to diverse students.

Although Beaudoin (1990) indicated that some students have levels of cognitive readiness for distance education classes and Gee (1990) states that learning style impacts achievement, this research project demonstrated that students who are field independent-dependent displayed no significant differences in their achievement rates. Distance education courses should continue to be

offered to field independent and field dependent students. Cognitive style, as determined by the GEFT, did not affect students' achievement in an asynchronous distance education telecourse at SVCC during the summer semester 1996.

Researchers, at other academic institutions, should replicate this study to support these findings. But more importantly other forms of research into the distance education learner must be explored to understand the mechanisms that are employed by successful telecourse students. Are students creating their own social networks to complete courses or are they employing other methods (such as repeated viewing of video lectures) to understand the course material and thereby successfully completing asynchronous courses? Future research should continue to explore the students who are the recievers of distance education.

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